



U.S. Department of Energy
Office of Inspector General
Office of Audits and Inspections

Inspection Report

Alleged Storage Capacity Concerns at
the Strategic Petroleum Reserve

INS-L-12-06

September 2012



Department of Energy
Washington, DC 20585

September 26, 2012

MEMORANDUM FOR THE PROJECT MANAGER, STRATEGIC PETROLEUM RESERVE

Sandra D. Bruce

FROM: Sandra D. Bruce
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Office of Inspector General

SUBJECT: INFORMATION: Inspection Report on "Alleged Storage Capacity Concerns at the Strategic Petroleum Reserve"

BACKGROUND

The Department of Energy's Strategic Petroleum Reserve (SPR) has the largest stockpile of government-owned emergency crude oil in the world. SPR provides the President of the United States with a response option should a disruption in commercial oil supplies threaten the U.S. economy. SPR consists of 62 caverns located at 4 sites in Louisiana and Texas, and is operated for the Department by DM Petroleum Operations Company (DM). The Office of Fossil Energy (FE) has primary oversight of SPR.

The SPR crude oil inventory is stored in underground salt caverns that have an authorized storage capacity of approximately 727 million barrels (MMB). These caverns are susceptible to "creep," a geological force that causes caverns to close over time, thereby decreasing available cavern space to store oil. A process known as "leaching" is used to create cavern space by injecting fresh water at high pressure to dissolve salt. In order to monitor and manage creep, SPR Project Management Office (PMO) established a self-imposed 20-year creep allowance as a benchmark for cavern maintenance planning purposes.

The Office of Inspector General received a complaint alleging that: (1) the Department and DM intentionally overfilled SPR; (2) Department and DM officials were awarded big bonuses to fill SPR to the authorized storage capacity; and (3) filling SPR to the authorized storage capacity played a role in a July 2010 fatality at one of the SPR sites. We initiated the inspection to examine the facts and circumstances surrounding the allegations.

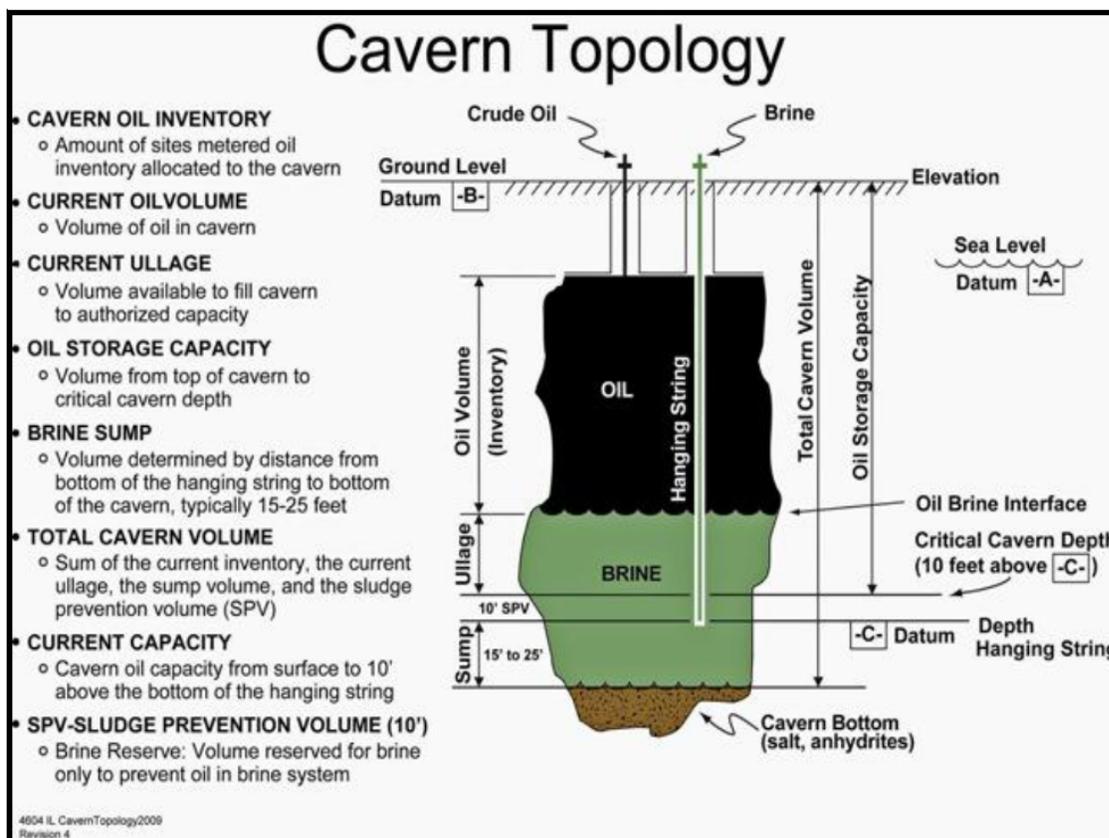
CONCLUSIONS AND OBSERVATIONS

We did not substantiate the allegations. We did find that the Department is in the process of addressing technical concerns that could impact the ability to sustain authorized storage levels.

During 2003, a reevaluation of SPR cavern storage capacity revealed that the existing storage could be increased by 27 MMB. In October 2004, FE's Office of Petroleum Reserves authorized the increase of cavern storage capacity to 727 MMB. In August 2005, the *Energy Policy Act of 2005* directed the expansion of SPR to one billion barrels from its then authorized capacity of

727 MMB. Incremental funding towards the expansion began in November 2005, which supported site acquisition activities such as engineering and geotechnical reviews, permit applications and environmental reviews.¹ However, in April 2011, Congress rescinded funding for the SPR expansion.

The SPR PMO self-imposed an allowance benchmark of 20 years to monitor and manage creep over 30 years ago. According to several Department officials, the 20-year self-imposed benchmark used for cavern maintenance planning purposes is not a written requirement. The benchmark, however, enables SPR PMO to monitor and manage cavern creep for operational readiness. The caverns which the SPR developed were designed to support five complete drawdowns that would have compensated for volume lost from cavern creep. The following drawing depicts a typical cavern at the SPR.



Storage Capacity

We did not substantiate the allegation that the SPR was overfilled. Starting in October 2006, Sandia National Laboratories (Sandia) raised concerns regarding decreasing SPR volume caused by changes in cavern operating pressures. In 2007 and again in 2009, DM raised concerns about

¹ The Department selected Richton, Mississippi, as the cavern site for expansion. During further consultation with several governmental entities, including the Mississippi Department of Environmental Quality and U.S. Fish and Wildlife Service, the Department proposed to prepare a supplemental environmental impact statement regarding the changes; however, in April 2011 funding for the expansion was rescinded.

the decreasing rate of cavern volume to meet the 20-year creep allowance that would indicate additional cavern maintenance would be necessary. Because SPR PMO, Sandia and DM could not reach consensus on these technical issues, SPR fill operations were not interrupted.

Efforts to resolve differing professional opinions on capacity issues between Sandia, DM and SPR PMO were completed in March 2010. As a result, SPR PMO implemented several corrective actions designed to help prevent further capacity decreases. Furthermore, in response to the Libya crisis, in June 2011, by Presidential Order, the SPR sold 30 MMB of crude as part of the coordinated International Energy Agency response. This reduction addressed the immediate capacity issues and permitted the Department to implement more aggressive leaching activities to maintain the authorized storage capacity.

Performance Awards to Fill SPR

We did not substantiate the allegation that the Department and DM officials were awarded "big bonuses" to fill SPR to the authorized storage capacity of 727 MMB. We reviewed the performance appraisals of four of the five SPR PMO managers for FYs 2009 and 2010 and determined that the awards received were not directly related to the 2009 fill activities. Further, we reviewed DM's Performance Evaluation and Management Plans and Performance Fee Board Reports for FYs 2006 through 2011 and determined that DM was incentivized and awarded to safely fill the SPR caverns to the authorized storage capacity of 727 MMB during FYs 2009 and 2010. However, we noted that the performance incentives were part of contractual performance work statements and the SPR PMO annually established standards for each major work area to be accomplished. In particular, DM's performance incentives were directly related to SPR PMO's objective of filling the caverns to the authorized storage capacity, as directed by the Department's Office of Fossil Energy. Additionally, we noted DM's performance fee related to the oil fill accounted for approximately 2.8 percent and 4.2 percent of the annual performance fee of approximately \$7 million, or \$200,000 and \$300,000 for FYs 2009 and 2010, respectively.

Fatality Related to Storage Capacity Concern

We did not substantiate the allegation that filling SPR to its authorized storage capacity played a role in a July 2010 fatality. Specifically, we confirmed that the fatality occurred while a contractor was cleaning a crude oil storage tank, but we could find no relation to the storage capacity concern identified in the allegation. We reviewed the Department's Office of Health, Safety, and Security (HSS) report, *Independent Review of the Fatality at the Strategic Petroleum Reserve Bryan Mound Site*, dated September 2010, and determined that the fatality was attributed to an equipment system failure. Also, our interview of a SPR PMO manager and review of tank maintenance schedule revealed that the tank cleaning activity was part of an ongoing scheduled maintenance program and not attributed to the fill activities. Additionally, we reviewed the HSS *Computerized Accident Incident Reporting System* (CAIRS) and determined that there had been no increase in safety incidents during the 2009 fill activities or the subsequent periods from 2010 through 2011. Furthermore, there were no additional CAIRS safety incident reports that were directly linked to the fill activities.

No recommendations or suggestions are being made; therefore, a formal response to this report is not required. We appreciate the cooperation of your staff during our inspection.

Attachment

cc: Deputy Secretary
Associate Deputy Secretary
Acting Under Secretary for Energy
Chief of Staff
Assistant Secretary for Fossil Energy
Deputy Assistant Secretary for Petroleum Reserves

OBJECTIVE, SCOPE AND METHODOLOGY

OBJECTIVE

The objective of this inspection was to determine the facts and circumstances surrounding the allegation that: (1) the Department and DM intentionally overfilled the Department's SPR; (2) Department and DM officials were awarded big bonuses to fill SPR to the authorized storage capacity; and (3) filling SPR to the authorized storage capacity played a role in a July 2010 fatality at one of the SPR sites.

SCOPE

The allegation-based inspection was performed from January 2012 through September 2012 at the SPR PMO Field Office in New Orleans, Louisiana, Sandia National Laboratory, in Albuquerque, New Mexico and at Fossil Energy Program Office in Washington, District of Columbia.

METHODOLOGY

To accomplish the inspection objective, we:

- Reviewed applicable regulations, directives, and policies related to authorized storage capacity;
- Reviewed and analyzed cavern capacity reports and cavern maintenance information;
- Conducted interviews with Federal and contractor personnel;
- Interviewed the complainant; and
- Reviewed safety incident and environmental reports.

We conducted this allegation-based inspection in accordance with the Council of the Inspectors General on Integrity and Efficiency's *Quality Standards for Inspection and Evaluation*. Those standards require that we plan and perform the inspection to obtain sufficient, appropriate evidence to provide a reasonable basis for our conclusions and observations based on our inspection objective. We believe the evidence obtained provides a reasonable basis for our conclusions and observations based on our inspection objective. Accordingly, the inspection included tests of controls and compliance with laws and regulations to the extent necessary to satisfy the inspection objective. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our inspection. Finally, we relied on computer-processed data, to some extent, to satisfy our objective. We confirmed the validity of such data, when appropriate, by reviewing source documents.

An exit conference was waived by the Strategic Petroleum Reserve Project Management Office and Fossil Energy officials.

PRIOR REPORT

Special Report on the *Expansion of the Strategic Petroleum Reserve* (DOE/IG- 0767, June 2007). The objective of the review was to evaluate serious concerns raised by the public and congressional entities about procedures used by the Department in eliminating Bruinsburg, Mississippi as an expansion location. For example, a member of Congress raised concerns to the Department on several occasions that in determining the size of the Bruinsburg salt dome, the Department had not: (1) considered existing well data, (2) resolved questions about data reliability concerning the location of wells, and (3) used existing seismic data. Additionally, four private-sector geologists concluded that the Bruinsburg salt dome was large enough to meet the Department's storage requirements for 160 million barrels of oil. Finally, Congress was concerned that the Department's planned approach at the Richton site to use a 100-mile long pipeline to the Gulf of Mexico to dispose of brine produced during the creation of the storage caverns could cause environmental damage due to pipeline leaks. Our review found that the Department and its contractor analyzed all available well data and seismic data related to the Bruinsburg site and augmented this information with 11 additional seismic tests. We also found that there are inherent uncertainties involved in the process of estimating the size of the salt domes. As a consequence, the exact size and shape of the Bruinsburg salt dome was not fully known. Professional geologists have interpreted the available data differently, and we were not able to resolve these differences of opinion. With reference to the concern about brine leaks, we found that the Department had improved its pipeline protection measures at its existing facilities and planned to employ such improved measures in support of the Richton storage operations.

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